
Space Weather Forecast

Issued on Friday 21 February 2025 at 01:12 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of Moderate flares. Possible glancing CME's day 3 (23 Feb).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with only occasional common class flares observed, the largest from a modestly sized bipolar region near centre disc at the time. There are seven sunspot numbered regions on the visible disc, and several small unnumbered regions of which most have developed during the period. Most numbered regions on the visible disc are relatively small and simple, with little growth or development observed. However, two modestly sized regions near centre disc remain the most notable regions on the disc, with some mixed magnetic complexity and a slight increase in flare activity through the period.

A filament was observed to lift off from the southeast, beginning around 20/0500UTC, with a narrow, south directed Coronal Mass Ejection (CME) now confirmed to be directed well below Earth orbit. Around 20/1000 UTC flaring in the vicinity of the eastern-most larger bipolar region mentioned above and now approaching centre disc, produced a new CME which has been analysed as possibly glancing Earth on day 3 (23 Feb).

Solar Wind / Geomagnetic Activity: Solar winds were predominantly slightly elevated and in the range of 450-500km/s. However, late in the day the solar winds decreased to background levels, ending the day near 380 km/s, indicating the declining influence of the enhancement from a previous coronal hole feature. The Interplanetary Magnetic Field was Weak. The north-south component was also Weak and mainly negative (southward). Geomagnetic activity was Unsettled initially then quickly decreased to become Quiet.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be generally Low, with a chance of isolated Moderate class flares.

Solar Wind / Geomagnetic Activity:

A CME followed a Common class flare at 19/2345 UTC from a now decayed region in the southwest, with modelling results indicating a chance of a glancing blow around the middle of the day (UTC) on day 3 (23 Feb). There is a lower chance of another CME brushing Earth on day 3, although earlier in the day, from weak flaring that occurred in the vicinity of a modestly sized bipolar region near centre disc at the time.

No significant solar wind enhancements are expected over the next few days, with a gradual easing trend within background levels expected. However, on day 3 (23 Feb) there is a chance of two glancing CME's as mentioned above. Late Day 4 (24th) a weak solar wind enhancement may occur associated with a small coronal hole feature in the northern hemisphere.

Geomagnetic activity is forecast to be mainly Quiet with a chance of isolated Unsettled intervals days 1 and 2 (21st and 22nd). Days 3 and 4 (23 and 24 Feb) activity may increase Unsettled to Active at times, with a chance on day 3 for an increase to Minor Storm levels due to a possible glancing CME's and a slight chance on day 4 with the possible arrival of a weak solar wind enhancement.

Energetic Particles / Solar Radiation: The count rate of energetic particles is forecast to persist at background levels.

Geomagnetic Storms

Geomagnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	1	1	30	20
Strong	G3	No	1	1	5	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	No	40	40	50	50
Very Active	R3-R5 (X Class)	No	5	5	5	5

Solar Radiation Storms (High Energy Protons)

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = cm ⁻² sr ⁻¹ s ⁻¹)						